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I got a young man to take it in two different positions, and have sent the drawings with the fish. See TAB. XXXV.

The small one may be called the sea-batt; and in some sort resembles that species of animals when it is swimming.

Additional Remark by Charles Morton, M.D. F.R.S.

The Patella, or Limpet Fish, whose generic characters, as enumerated by Bishop Wilkins, are, that it is an exanguious testaceous animal, not turbinated; an univalve, or having but one shell; being unmoved; sticking fast to rocks or other things; the convexity of whose shell doth somewhat resemble a short obtuse-angled cone, having no hole on the top.

CXVI. *A Discourse on the Cinnamon, Cassia, or Canella.* By Taylor White, Esquire, F. R. S.

Read Dec. 21, 1758. **T**HE Cinnamon, Cassia, or Canella, are shrubs of no great height: they grow in Ceylon, Malabar, Java, Sumatra, and other places in the East Indies; as I think, in the island of St. Thomas, and on the coast of Coromandel.

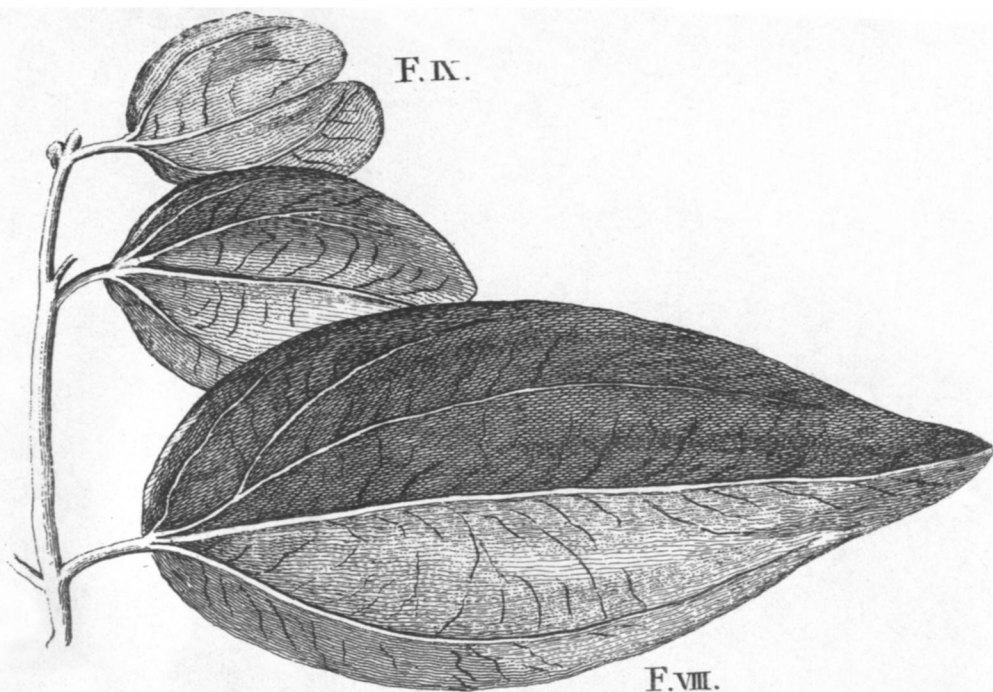
They are described by Mr. Ray, in his *History of Plants*, vol. ii. f. 1559. under the title *de Arboribus Pruniferis*.

Linnæus,



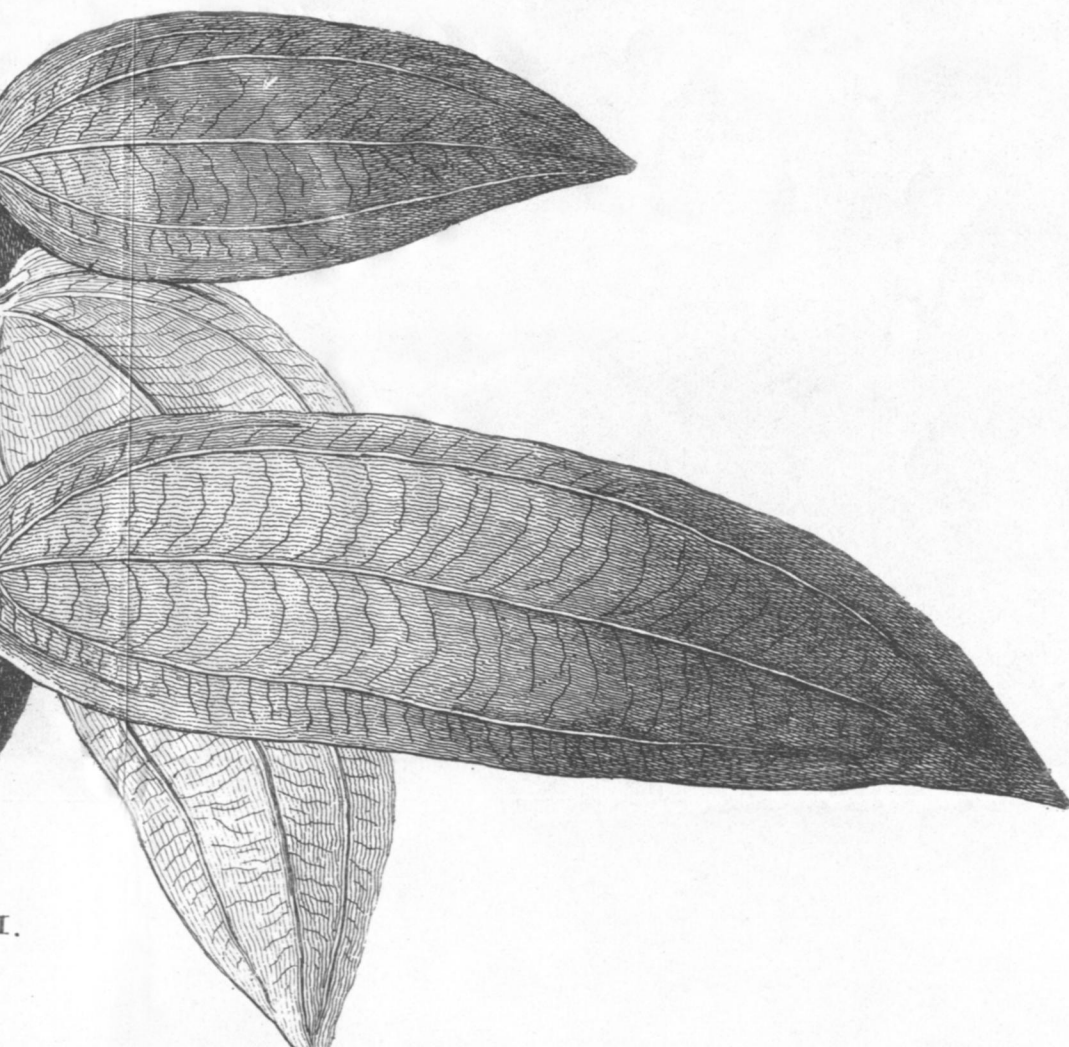


Fig. I.



F. IX.

F. VIII.

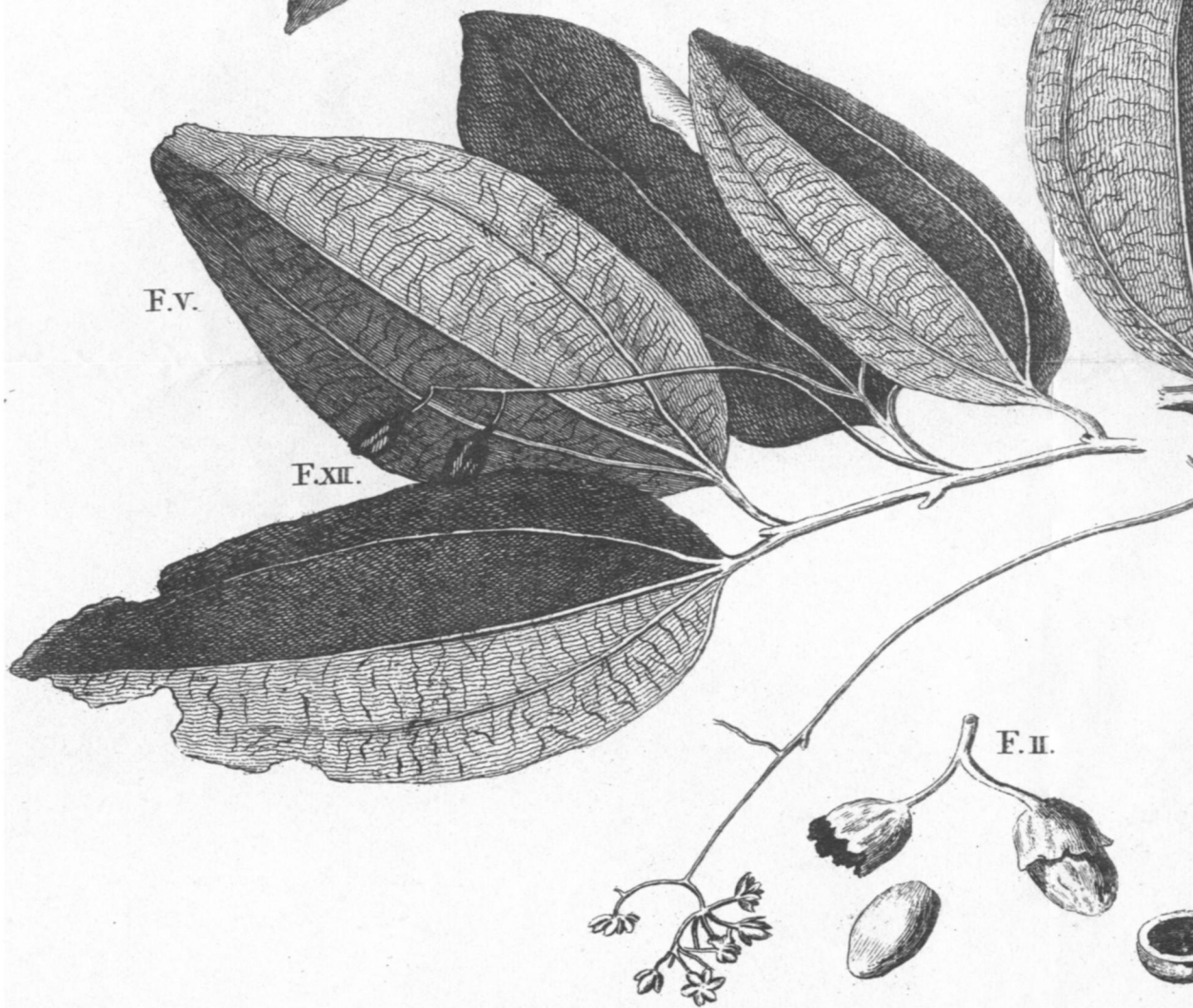


F.



F.V.

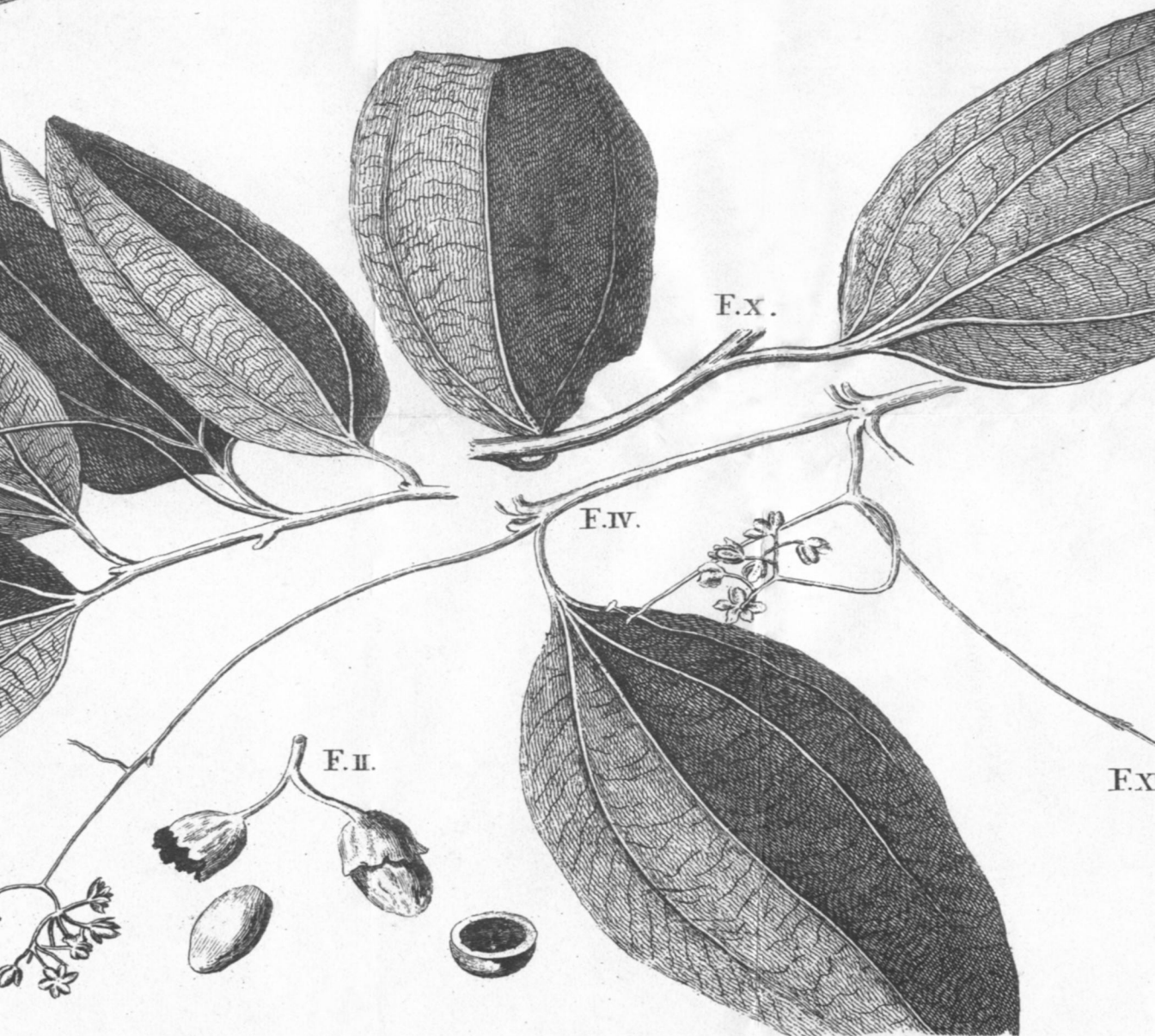
F.XII.



F.II.



Fig. I.

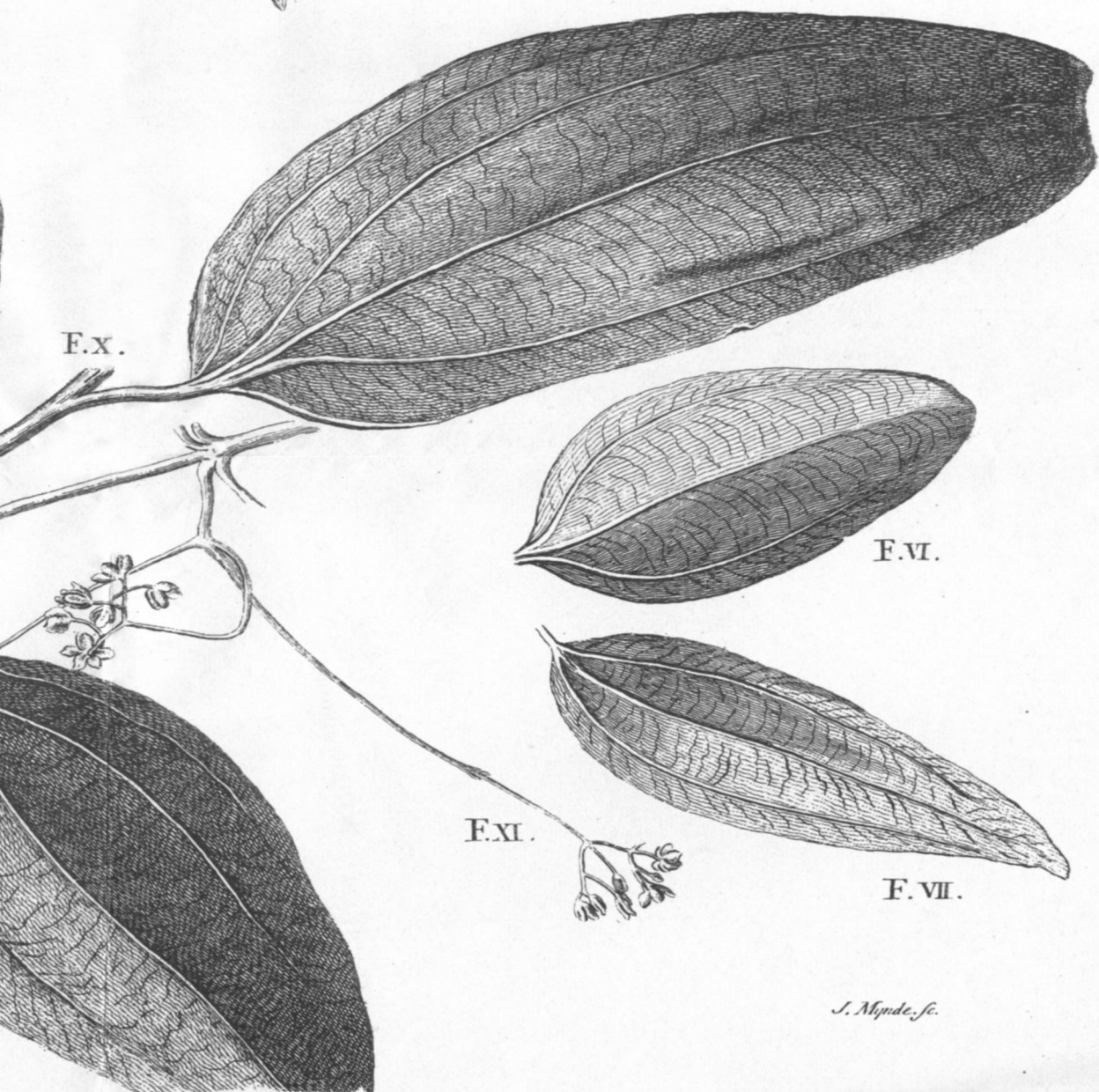
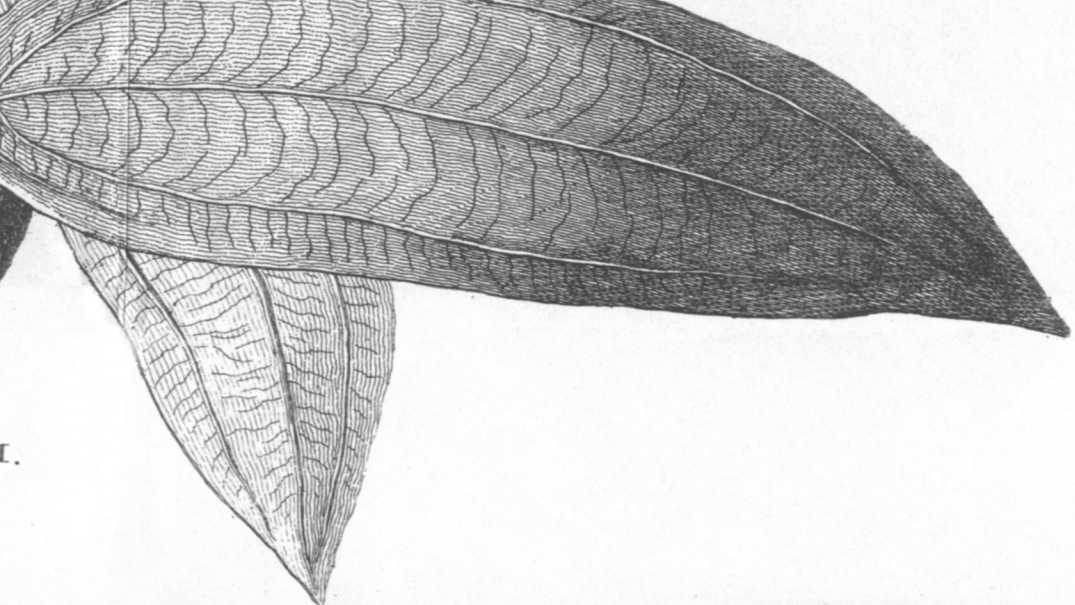


F.X.

F.IV.

F.II.

EX



J. Mynde. sc.

Linnaeus, in his *Species Plantarum*, places them under the title *Enneandria Monogynia*, by the name *Laurus*.

The leaf, flower, and fruit, of this plant, are particularly described by Mr. Ray.

The leaf is smooth and shining; has one large vein running thro' the midst, and a remarkable one on each side; the middle one generally running near the length of the leaf.

The leaves differ in shape, some being more acute, others more oval or obtuse.

The flowers grow in an umbel, somewhat like the *Laurus Tinus*; but they are small, consisting of one petal, of a tubular form at the bottom, and divided at the top into six segments in the form of a star.

The flowers are succeeded by berries growing out of a capsula, like acorns in shape; which berries contain a shining seed.

The description of Mr. Ray of the flower, in his description of the Cinnamon of Malabar, is extremely accurate; as is also the figure in the *Hortus Malabaricus*, N^o. 54. and the description, fol. 107. under the name *Carua*. I shall therefore refer to those.

I shall not trouble you with the question debated by Mr. Ray, whether the Cinnamon and Cassia of the ancients were, or were not, the same with those so called by the moderns? whether the Cinnamon of the ancients was the twigs of the tree bearing cloves, or any plant now unknown to us? Mr. Ray has largely treated on this subject; and to him I refer such as are curious to be informed on this subject.

But as the Cinnamon and Cassia of the ancients are said to have been used as perfumes, and to make
 4 perfumed

perfumed ointments, I think they must have differed from ours, whose smell is not very fragrant, nor is emitted to any great distance.

The matter of the present inquiry is, whether the Cinnamon of Ceylon is the same sort of plant with that growing in Malabar, Sumatra, &c. differing only by the soil or climate, in which it grows, which is the opinion of Garcias; or from the culture or manner of curing the plant, as I am inclined to believe; or whether it is really a different genus or species of plant, as many people believe, and some botanical writers seem to indicate.

I shall endeavour to explain this matter by producing, 1st, The descriptions of the most celebrated authors:

2dly, By producing the most accurate figures of the plants of Sumatra and Ceylon: [See Tab. xxxvi.]

3dly, By shewing the specimen of the leaves and branches brought from Sumatra.

I have no specimen from Ceylon; but have carefully examined the specimens kept in the British Museum, with the assistance of Dr. Maty and Mr. Empson, and compared them with the specimens I have from Sumatra; from whence I traced exactly the figures brought herewith: which specimens are undoubtedly brought from Ceylon, and were the collections of Boerhaave, Courteen, Plukenet, and Petiver.

But, previous to this inquiry, I would premise, that the writers, who give the description of the Cinnamon of Ceylon, were probably not acquainted with that of Malabar at the time of their publishing their works.

Mr.

Mr. Ray also, who so accurately describes the flower of the Cinnamon of Malabar, seems not so well acquainted with its fruit; and probably had then never seen the specimens of the Cinnamon from Ceylon; for his description is plainly borrowed from others, and not his own. Tho' I have reason to think he afterwards saw the specimens of Mr. Courteen, and was convinced, that the plants were the same.

In his description of the Cinnamon of Ceylon, he supposes differences in the manner of veining the leaf, which are not found in the leaves themselves. He supposes, that the Cinnamon of Ceylon differs from that of Malabar by its berries growing in cups like acorns; which is apparently the same in both, as may be seen in its figure in the *Hortus Malabarius*.

The other differences taken notice of by the botanic writers are as follow :

In the *Flora Zeylanica*, p. 545. and in the *Materia Medica*, 190. the Cinnamon of Ceylon is called *Laurus foliis trinerviis ovato-oblongis nervis unientibus*: which description is adhered to in the *Hortus Cliffordiensis*, p. 154. under the name *Laurus foliis oblongo-ovatis nitidis planis*. And Burman, in his *Flora Zeylanica*, 62. T. 27. calls it *Cinamomum foliis latis ovatis*. Whereas the Cassia of Sumatra is distinguished by these writers: that in *Flora Zeyl.* 146. and in *Materia Medica*, 191. is called *Laurus foliis trinerviis lanceolatis nervis supra basin unitis*: and Burman, *Zeylan.* 63. T. 28. calls it *Cinamomum perpetuo florens folio tenuiore acuto*.

The distinction therefore, which these writers would make us believe there is between these plants, consists in

in the leaves of the one being oval, the other sharp-pointed ; and that the nerves are limited at the bottom in the Cinnamon, but not so in the Cassia : for as to the *semper florens*, mentioned by Burman, that must undoubtedly be common to both.

Now as to the different shape of the leaves, we know how often this happens by seminal varieties, and from the age of plants, as in the leaves of holly and ivy ; and that even the shapes of leaves vary greatly on the very same plant, and sometimes on the same branch ; as in the ash, and many other plants, the leaves of the young shoots are more oval than those on the old boughs, which are generally more pointed. But this variety is much more frequent in the plants of warm countries. In the saffrafras, part of the leaves generally near the bottom of the plant are plain, whilst the other leaves are divided into three lobes or segments. I have observed great difference also in the leaves of almost every one of the American oaks.

In the Virginian cedar, the berries of the same plant produce some plants with juniper leaves, and others with leaves like the savin ; and some plants with both leaves growing on the same plant.

I must observe, that Burman has, in his figures of the two plants before mentioned, made them extremely different. In that of Ceylon he has made all the leaves oval ; and, to make the difference greater, has drawn the rudiments of the berries ; to which he has added the flower, or part of it, at the top of the style or rudiment of the fruit : and in that of Malabar he has drawn the flower growing in the umbel.

On these drawings I must observe, that his drawing of the Cinnamon of Ceylon agrees with no one specimen in the British Museum; and scarcely is one leaf to be found of the shape, which he gives.

The first figure, which I shall produce, is a drawing, which I procured from the ingenious Mr. Ehret in the year 1754: which, as I am informed by Mr. Empson, was from a specimen, given to Mr. Ehret by him in that year, of the Cinnamon of Ceylon. *See Fig. 1.*

This agrees in every thing with the drawing of the Cinnamon of Malabar in the *Hort. Malab.* fig. 54. fol. 107. and there called Carua; except that it wants the fruit: but that defect is supplied by Mr. Ray's description of the Cinnamon of Ceylon above mentioned. *See fig. of the fruit, Fig. 2.*

In the figure in the *Hort. Malabar.* it may be observed, that the nerves do not go quite to the bottom of the leaf. But this is merely accidental, as will appear by the leaves of the same plant brought from Sumatra, which I shall produce; in which, part of the leaves have veins going quite to the bottom, and united there, and the others not so. *See Fig. 3.*

The next drawing I shall produce contains that of the leaves of the Cinnamon plant, from specimens in the British Museum.

Fig. 4. A specimen, with the flower, from the collection of Mr. Courteen, who lived long in Ceylon. These leaves were more pointed, but were broke at the end.

Fig. 5. A whole leaf, with its point, in the same collection, growing on a branch, on which are the rudiments of the fruit.

Fig. 6. A leaf in Plukenet's specimens.

Fig. 7. Another leaf of the same collection, and of the same plant.

Fig. 8. A leaf of a large specimen from Boerhaave's collection.

Fig. 9. Another leaf on the same branch.

Fig. 10. A specimen from Petiver's collection.

The points of the leaves are broken off.

Fig. 11. The flower of the first specimen.

Fig. 12. In the rudiment of the seed before formed, in the state given in Burman's first drawing.

Note, It is to be observed also, that the specimens of the Cinnamon of Ceylon are probably of cultivated plants.

From all these specimens it plainly appears, that the distinction of *foliis ovatis & lanceolatis* does not appear well founded.

But were it otherwise, and that the leaves of the plants differed, it would by no means be a proof of any material difference in the nature or quality of the plants; as is well known to persons conversant in natural history.

Before I leave this subject of the description of the plant, it may be proper to mention, that Bauhin calls the one of these plants *Cinnamomum* or *Canella Malabarica & Javanensis*, and the other *Cinnamomum Canella Zeylanica*; Bauhin. *pinax* 408 and 409; but neither from these names, nor from his description, can any conclusive argument be formed: and that Herman, in his *Hort. Lugd. Batav.* 129. t. 1655. calls this Cinnamon of Ceylon *Cassia Cinnamonia*.

If any conjecture can arise from hence, it may be, that the Cinnamon of Ceylon was formerly, as well

as that of Sumatra and Malabar, called Cassia ; but that the Dutch writers, being acquainted with the excellent qualities, which the ancients ascribed to their Cinnamon, chose to add the name Cinnamon to that of Cassia : and in process of time they have found the name of Cinnamon more profitable than that of Cassia, by which we chose to call our Canella, to our national loss of many thousands a year.

Having now given an account of the figure of these plants, and in what respect they are said herein to differ ; I shall proceed to consider the pretended differences in the Canella itself ; which are supposed not to be in form only, but substantial and material ; and are generally understood to be so by persons supposed to be acquainted with the subject.

Mr. Ray states this matter fully in his *Hist. Plant.* vol. ii. p. 1560. in these words: *Officinæ nostræ Cassiam ligneam a Cinnamomo seu Canella distinctam faciunt, Cassiam Cinnamomo crassiore plurumque esse, colore rubicundior, substantiâ durior, solidior, & compacter, gustu magis glutinoso, odore quidem & sapore Cinnamomum aptius referre, tamen Cinnamomo imbecilliorum & minus vegetam esse, ex accurata observatione Tho. Johnson.*

From these reasons Mr. Ray draws a conclusion (I must own not very instructive), that the Cinnamon of Ceylon is Cinnamon ; and the Cinnamon of Malabar, &c. is the Cassia of the shops.

From the specimens I shall now produce, it will most plainly appear, that these differences are merely accidents arising from the age of the Canella, the part of the tree from whence it is gathered, and from the manner of cultivating and curing it.

In the *Philosoph. Transact.* N^o. 278. p. 1099. in Mr. Strachan's account of Ceylon, which is abridged by Eames and Martyn, vol. ii. p. 183. he says, that there are two sorts of Cinnamon-trees, of which the tree, which is esteemed the best, has a leaf much larger and thicker than the other ; but otherwise no difference is to be perceived.

Note, Here is no mention of the *folio ovato*.

I remember, in an account given some years ago to the Royal Society, three or four sorts were mentioned ; and it was said the best sort was cut every three or four years.

This superiority I then guessed (as well as the difference of leaves mentioned by Mr. Strachan) to arise from the cutting the tree down every three or four years ; which occasioned it to produce strong and vigorous shoots, thicker and larger leaves, as well as greater quantity of bark, and of a superior quality.

A large shoot or sucker of this plant was produced in the year 1750. or 51. by my worthy friend Dr. William Watson, together with an account of the Cinnamon-tree ; which is published in the *Philosoph. Transact.* vol. xlvii. p. 301. This shoot was a plain proof to me, that the Cinnamon was frequently cut down, and that this shoot arose from the root of a plant so cut ; for it was of the size of a walking-cane ; and no shrub could have produced such a shoot, unless a strong plant cut down.

This method of treating this plant accounts for the mistake of Garcias, mentioned by Mr. Ray ; viz. *Quæ Garcias habet de duplice hujus arboris cortice ad modum suberis, nobis suspecta sunt, quæque de liberatione*

liberatione semel triennio facta ; non enim puto renascitur cortex semel detractus.

This shews, that the bark was gathered every three years : but Mr. Ray was not acquainted, that the plant was cut down, in order to take off the bark, once in three years.

In the account above mentioned to be given to the Society by Dr. Watson, no descriptions are given either of the plants of Ceylon, or Malabar ; but he quotes Burman, who says, that he had nine different sorts of Cinnamon from Ceylon, of which that, which is the best, is brought to us, and called by the name *Rasse Coronde*.

What the differences between these sorts were, does not appear ; whether in leaf or bark, or manner of culture. And I must observe, that in all the specimens in the British Museum I could observe no difference of species. But this is to be understood, that every sort coming from Ceylon is, by the Dutch and by the shops, called Cinnamon ; and that of our own growth is by them always called Cassia. The reason is obvious.

The specimens, which I now produce, of the Canella or bark of the Cinnamon of Sumatra, I procured in the year 1755. from Mr. Tho. Combes, a gentleman then in the service of the East India Company in Sumatra, by means of a friend.

I was then attempting to form a society for the carrying on a General Natural History, to try proper experiments, and to employ proper painters and engravers suitable to the importance of the subject ; and therefore attempted to establish a correspondence in those parts, whose productions are as yet little known to the public.

I men-

I mention this design, because it would not be possible else to explain what Mr. Combes means by the word *Society*, which he so often mentions in his letter; of which I shall produce an extract, so far as it relates to the present inquiry.

It seemed to me very improbable (as the same plants are generally found in the same latitude and soil), that the spices now in the possession of the Dutch should grow only in that small tract of land, which is in their possession. And I had many credible informations, that, whatever they may pretend to the contrary, this is only a pretence.

I therefore desired to obtain the best information of the nature and culture of the plants producing spices, as well as of many other things, which are foreign from this inquiry.

I desired to know, how the spices were dried and cured; and that different specimens might be sent me of the plants, their seed, flower, leaf, and bark, and properly cured and prepared.

This produced the answer I lay before you herewith, together with the specimens now produced.

You see hereby, that the Dutch dry their Cinnamon in sand; probably to take away that viscosity, which is complained of in the Cassia.

And you will observe also, that the specimen produced dried and cured is also as free from any viscosity, as the Cinnamon of Ceylon; That it agrees also with the Cinnamon in every other quality, and in colour; and that none of the distinctions mentioned by Mr. Ray can be found herein; but that they may arise from the part of the tree, from whence the bark was taken; the inner bark of the large wood being red, as you see by the other specimen produced.

produced. And the common Cassia taken from the larger branches, and not cured, has the viscosity complained of in some degree, tho' much less than it had four years since, when I received it.

Mr. Ray says, that one is weaker in taste, as he supposes, than the other. That may be so from its manner of drying, or keeping of it. Dried in large quantities, and by a stronger heat, it will probably be stronger, than if it is dried in a lesser quantity, and slower.

As for the viscosity, the glutinous part is found in every plant in some degree, as well as in every animal. It preserves the parts from moisture; but will be consumed by heat or time; and it will be a preservative to the plant, till it is destroyed; which was the reason, as I suppose, that Mr. Ray mentions Cassia to have kept good thirty years, the viscosity not having been destroyed by drying.

I suppose the reason, which the Dutch have to dry it, is to make it sooner fit for the market, and possibly fitter for distillation.

You will see from Mr. Combes's letters and specimens, that he thinks there may be two sorts of Cassia or Cinnamon in Sumatra: possibly there may be the same difference in Ceylon; but, if so, I suspect them both to be only seminal varieties, and that their virtues are the same.

Mr. Barlow, some time since a Surgeon in the service of the India company, made a considerable quantity of oil of the Cassia of Sumatra, which was very little, if any thing, inferior to that drawn from Cinnamon; and it was sold to great profit.

If these plants are really the same, or if they are of equal goodness, supposing there was a small difference

ference in the form of the leaf, it might be well worth the attention of the East India company to try to cultivate these plants in the manner they do in Ceylon; that is, to make plantations in a proper soil; and to have regard to the proper distance from the sea of the place, where they try the experiment: for some plants require to be near the sea, and others far from it, in Sumatra; which is the case of the Mango, and Mangosteen; the one of which must be near the sea, the other at a distance from it.

I think the plants should be suffered to grow strong, to be six or seven years old, and then cut every three years, the bark peel'd off and dried in hot sand, and packed close, and kept dry. This I take to be all necessary to be done, to try, if our Cinnamon will not produce as good a price as that of the Dutch.

Perhaps the plants need not stand so long before cut; for the vegetation of plants in hot countries is very great.

There are many other most valuable vegetables in Sumatra, which might be made staple commodities, as sagoë, camphire, several sorts of ginger, rice, and many other, which are foreign to the present inquiry.

But it may not be amiss to recommend it to the traders to Sumatra to bring some quantity of the twig-bark of the true Cassia, well cured; and also to the company, to have a chemist at Sumatra, to extract carefully the oil of Cassia; which is best, and in greatest quantities, produced from the bark of the body, and of the larger branches of the tree: and also that the company would procure an exemption of all customs or duties on Cassia, or on the oil of Cassia, for some time: and also that the college of

physicians in their dispensatory would direct Cassia or Cinnamon of Malabar or Sumatra to be used, instead of the Cinnamon of Ceylon; and that the same should be used by apothecaries and distillers, and in all simple and compound waters, in which Cinnamon is used.

*Extract of a Letter from Mr. THOMAS COMBES,
dated Fort Marlborough, 5 Jan. 1755.*

IN regard to the first article of your paper, now before me, which is the inquiry desired to be made concerning the spices, I am of opinion, that the true Cinnamon grows no-where but on the island of Ceylon, unless Cassia be allowed to be the same tree, which I am inclined to think.

Nº. 9. contains seeds of the Cassia or wild Cinnamon-tree. As for the seeds of the true Cinnamon-tree, I believe they are very difficult to be got; for as the Dutch are the sole masters of this spice, and get a good deal of money by it, I fancy, according to their usual custom, they have very well guarded against the transplantation of it. I hope however, that these seeds will not be unacceptable to the society, as Cassia itself is of some value; and as I am very doubtful, whether this tree is not the same with the true Cinnamon, being of opinion, that the difference observed in them arises from the different method of curing their barks, or from the taking the bark from different parts of the tree, or at different seasons, or of different ages, or perhaps all these.

I have made inquiry concerning this from some very intelligent persons, and found them to be of

opinion, that the Cassia and Cinnamon-tree were of the same genus. I have inquired further concerning the method of curing it at Ceylon ; but as this is done by the natives, the Dutch are not very well acquainted with it ; nor could I obtain any good account of it, different people giving me different relations. Some said, it was the inner bark, some the middle, and some the outer ; tho' of the young branches, they seemed in general to agree, that it was gathered at a certain season of the year, and that one part of the cure was burying it in sand for some time. This may be tried with Cassia, and may perhaps take away that viscosity or glutinous quality observed by chewing it, and which is the principal mark for distinguishing it from Cinnamon. As to their chemical oils, I have heard many people say, that they are not distinguishable otherwise, than that from Cinnamon is generally better, or, as it may be called, stronger, than that from Cassia ; and accordingly bears a better price. But the Dutch company's chemist at Batavia, if I may give him this title, informed me, that they are essentially different, and plainly distinguishable. But I must confess myself very doubtful of the knowledge or veracity of this chemist, and strongly suspect, that they are no otherwise different than in goodness, as many other oils drawn from the same subject are.

I observe the price of Cassia is greatly risen in England within these two or three years ; but whether this be owing to an increase in the consumption, or a decrease in the importation of this commodity, I cannot say.

The Dutch government of Batavia has this year, in some new regulations of their trade, prohibited to
all

all persons the dealing in any of the fine quilled sort of Cassia, and declared the same to be contraband, and reserved for their company only; and put it upon the same footing as their Cinnamon.

What reasons induced them to this, I am yet a stranger to; but it makes me suspect, that the rise of this commodity in Europe is owing to some other cause than a deficiency in the importation thereof. Perhaps some discovery has been made rendering Cassia equal to Cinnamon.

In Persia, I think, they make not so great a difference between them as elsewhere; and I myself, for want of Cinnamon here for some months past, made use of the fine quilled Cassia; and the difference I observe between them I imagine to arise rather from the greenness and want of dryness in the Cassia, than any thing else, or perhaps from the method of curing it: for if there happens to be a little too much Cassia put into my chocolate (and other things I use in it), a little bitterish taste arises, something like what we meet with in most barks; tho' I do not remember to have observed this of Cinnamon: but as to its boiling to a jelly, as Quincy mentions, I find no such thing, and think it bears boiling as well as Cinnamon. Nor do I think its distilled water more subject to an empyreuma than that of Cinnamon.

I have inquired of the country people here, who bring it us, and they tell me the finest sort is the inner bark of the small branches; and indeed that it is the inner bark, I think, is evident in Cinnamon as well as Cassia; no outer bark of the youngest branches of any tree having, in my opinion, that smooth surface observable in both these barks.

I once thought, that it was better to take the bark from the body of the tree than from the branches, imagining that the bark from the trunk or body of all trees must in general be stronger, let its natural taste be what it will, than from its branches. This I find to be so in Cassia ; and I have been informed, that the large ligneous pieces of Cassia have afforded rather more oil in distillation than the fine quilled sort, their weight being equal ; but upon trial I could not make the bark from the trunk curl or roll up, as it ought to do, owing, as I suppose, to my unskilfulness, or to rigidity, or the natural position of its fibres ; for the bark of the younger branches curled of itself, wanting hardly any other assistance than the sun.

I have already observed, that Cassia is found in chewing to have a viscidness, which Cinnamon has not. I have endeavoured to remove this in a little I send you, marked B : pray let me know, if it answers ; and be assured, it was taken from the younger branches of the tree, of which I send you the seeds.

I send you also, marked C, some of the bark taken from the same tree ; as also some of the leaves, marked D.

I have sent you also a little of the bark of the trunk of a tree, which, tho' called Cassia, seems not to be so, marked E ; and also the leaves of the same tree, marked F.

END of the FIFTIETH VOLUME.